

## CLAIMS

1 1. A method for facsimile transmission over a packet  
2 network, comprising:

3        establishing a facsimile call between first and  
4        second facsimile terminals in accordance with a facsimile  
5        protocol, using a facsimile gateway to convey  
6        communications between the terminals over the packet  
7        network;

8           awaiting arrival at the gateway of a signal conveyed  
9   over the packet network from the first terminal, to be  
10   transmitted from the gateway to the second terminal as  
11   provided by the protocol;

12       transmitting a fill page from the gateway to the  
13       second terminal if the signal does not arrive within a  
14       time limit determined in accordance with the protocol;  
15       and

16           receiving the signal at the gateway and transmitting  
17   the signal from the gateway to the second terminal after  
18   transmitting the fill page.

1 2. A method according to claim 1, wherein the facsimile  
2 protocol comprises a T.30 protocol of the International  
3 Telecommunications Union (ITU-T).

1 3. A method according to claim 2, wherein the packet  
2 network operates in accordance with an Internet Protocol  
3 (IP).

1 4. A method according to claim 3, wherein establishing  
2 the facsimile call comprises establishing a real-time fax  
3 over IP connection, and wherein transmitting the fill  
4 page comprises initiating a session fax mode of  
5 communication in response to a network delay causing the  
6 signal to fail to arrive within the time limit.

1 5. A method according to claim 4, wherein establishing  
2 the real-time fax over IP connection comprises  
3 establishing the connection in accordance with an ITU-T  
4 T.38 protocol.

1 6. A method according to claim 1, wherein the first  
2 terminal comprises a sending terminal, and the second  
3 terminal comprises a receiving terminal, and wherein  
4 awaiting the arrival of the signal comprises awaiting  
5 transmission of a complete page of facsimile data from  
6 the sending terminal.

1 7. A method according to claim 6, wherein the gateway  
2 comprises a receiving gateway linked to the receiving  
3 terminal by a telephone line, and wherein awaiting the  
4 transmission of the complete page comprises awaiting the  
5 transmission of the complete page by a sending gateway  
6 linked to the sending terminal.

1 8. A method according to claim 1, and comprising  
2 awaiting arrival of a training message indicative of  
3 capabilities of the first terminal and conveyed over the  
4 packet network from the first terminal, and if the  
5 training message does not arrive within a training time  
6 limit determined in accordance with the protocol,  
7 initiating a default training sequence between the  
8 gateway and the second terminal, substantially  
9 independently of the capabilities of the first terminal.

1 9. A method according to claim 1, wherein the first  
2 terminal comprises a receiving terminal, and the second  
3 terminal comprises a sending terminal, which sends at  
4 least one page of facsimile data to the receiving  
5 terminal over the packet network using the facsimile

6 gateway during the facsimile call, and wherein awaiting  
7 the arrival of the signal comprises awaiting a  
8 notification of delivery of the at least one page to the  
9 receiving terminal.

1 11. A method according to claim 9, wherein the at least  
2 one page of facsimile data comprises first and second  
3 pages of facsimile data, and comprising transmitting a  
4 confirmation signal from the gateway to the sending  
5 terminal after receiving the first page from the sending  
6 terminal at the gateway, responsive to which the sending  
7 terminal sends the second page to the gateway, before  
8 receiving a confirmation packet at the gateway over the  
9 network indicating that the first page was received at  
10 the receiving terminal.

3        establishing a facsimile call between a sending  
4        terminal and a facsimile gateway in communication with  
5        the packet network;

8       conveying the first page of the facsimile data from  
9   the gateway over the packet network to a receiving  
10 terminal;

14 confirmation packet over the network indicating that the  
15 first page was received at the receiving terminal;  
16 responsive to transmitting the confirmation signal,  
17 receiving a second page of facsimile data from the  
18 sending terminal;  
19 conveying the second page of the facsimile data over  
20 the packet network to the receiving terminal;  
21 awaiting arrival at the gateway of the first  
22 confirmation packet and of a second confirmation packet  
23 over the network indicating that the second page was  
24 received at the receiving terminal; and  
25 responsive to the first and second confirmation  
26 packets, sending a notification from the gateway to the  
27 sending terminal before terminating the facsimile call  
28 that the pages were delivered to the receiving terminal.

1 13. A method according to claim 12, wherein establishing  
2 the facsimile call comprises establishing the call in  
3 accordance with a T.30 protocol of the International  
4 Telecommunications Union (ITU-T).

1 14. A method according to claim 13, wherein the packet  
2 network operates in accordance with an Internet Protocol  
3 (IP).

1 15. A method according to claim 14, wherein establishing  
2 the facsimile call comprises initiating a real-time fax  
3 over IP connection, and wherein sending the notification  
4 comprises completing the call in a session fax mode.

1 16. A method according to claim 15, wherein initiating  
2 the real-time fax over IP connection comprises  
3 establishing the connection in accordance with an ITU-T  
4 T.38 protocol.

1 17. A method according to claim 12, and comprising  
2 performing a line turnaround and sending at least one  
3 fill page from the gateway to the sending terminal when  
4 one or more of the first and second confirmation packets  
5 do not arrive at the gateway within a predetermined time  
6 limit.

1 18. A method according to claim 12, wherein establishing  
2 the facsimile call comprises establishing the call over a  
3 telephone line between the sending terminal and the  
4 facsimile gateway.

1 19. A method according to claim 18, wherein the gateway  
2 comprises a sending gateway, and wherein conveying the  
3 first and second pages of the facsimile data comprises  
4 conveying the pages from the sending gateway over the  
5 packet network to a receiving gateway, which transmits  
6 the pages to the receiving terminal.

1 20. Apparatus for facsimile transmission over a packet  
2 network, comprising a computer gateway, in communication  
3 with the packet network and configured to establish a  
4 facsimile call between first and second facsimile  
5 terminals in accordance with a facsimile protocol and to  
6 convey communications between the terminals over the  
7 packet network during the call, the gateway being adapted  
8 to await arrival of a signal conveyed over the packet  
9 network from the first terminal, which signal is to be  
10 transmitted from the gateway to the second terminal as  
11 provided by the protocol, and to transmit a fill page to  
12 the second terminal if the signal does not arrive within  
13 a time limit determined in accordance with the protocol,  
14 and upon receiving the signal, to transmit the signal to  
15 the second terminal after transmitting the fill page.



5 the training message does not arrive within a training  
6 time limit determined in accordance with the protocol, to  
7 initiate a default training sequence with the second  
8 terminal, substantially independently of the capabilities  
9 of the first terminal.

1 32. Apparatus according to claim 31, wherein the gateway  
2 is adapted to establish the facsimile call in accordance  
3 with a T.30 protocol of the International  
4 Telecommunications Union (ITU-T).

1 34. Apparatus according to claim 33, wherein the gateway  
2 is adapted to establish the facsimile call as a real-time  
3 fax over IP connection, and to complete the call by  
4 sending the notification in a session fax mode.



1 36. Apparatus according to claim 31, wherein the gateway  
2 is adapted to perform a line turnaround and to send at  
3 least one fill page to the sending terminal when one or  
4 more of the first and second confirmation packets do not  
5 arrive at the gateway within a predetermined time limit.

1 38. Apparatus according to claim 37, wherein the gateway  
2 comprises a sending gateway, which is adapted to convey  
3 the first and second pages over the packet network to a  
4 receiving gateway, which transmits the pages to the  
5 receiving terminal.

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15 limit determined in accordance with the protocol, and  
16 upon receiving the signal, to transmit the signal to the  
17 second terminal after transmitting the fill page.

1 40. A computer software product for facsimile  
2 transmission over a packet network, comprising a  
3 computer-readable medium in which program instructions  
4 are stored, which instructions, when read by a facsimile  
5 gateway computer in communication with the packet  
6 network, cause the computer to establish a facsimile call  
7 with a sending terminal, to receive a first page of  
8 facsimile data from the sending terminal, to convey the  
9 first page of the facsimile data over the packet network  
10 to a receiving terminal, and to transmit a confirmation  
11 signal to the sending terminal after receiving the first  
12 page without having waited to receive a first  
13 confirmation packet over the network indicating that the  
14 first page was received at the receiving terminal, and  
15 further cause the computer to receive a second page of  
16 facsimile data from the sending terminal responsive to  
17 transmitting the confirmation signal, and to convey the  
18 second page of the facsimile data over the packet network  
19 to the receiving terminal, and still further cause the  
20 computer to await arrival over the network of the first  
21 confirmation packet and of a second confirmation packet  
22 indicating that the second page was received at the  
23 receiving terminal, and responsive to the first and  
24 second confirmation packets, to send a notification to  
25 the sending terminal before terminating the facsimile  
26 call that the pages were delivered to the receiving  
27 terminal.

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